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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/837,543	04/19/2001	Stig Sarkimukka	2466-63	7576

7590 11/18/2002

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EXAMINER
ARTMAN, THOMAS R

ART UNIT	PAPER NUMBER
2882	

DATE MAILED: 11/18/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/837,543	Applicant(s) SARKIMUKKA ET AL.	
	Examiner Thomas R Artman	Art Unit 2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-15 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-15 is/are rejected.

7)☒ Claim(s) 3 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☒ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Claim Objections

Claim 3 is objected to because of the following informalities: at the end of line 20 of claim 3, it appears as though the word "second" should be inserted into the phrase "...and the second cross-connect element...". Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-5, 7-13, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Alexander (US 5,712,932) and in view of Way (US 6,421,153).

Regarding claim 1, Alexander discloses an optical WDM transmission network (Fig.1), including:

1) a transmitting side and a receiving side connected by an optical fiber link (item 50),

2) high-priority information (customer information, as opposed to service channel, item 235) being transmitted over the system over a number of wavelength bands less that the total number of wavelength bands, and

3) transmission takes place over a plurality of wavelength bands.

Although it is not explicitly shown that there is a receiving side, it would have been obvious to one of ordinary skill in the art at the time the invention was made that a transmission portion of a network is going to have a receiving side with the same number of channels.

Alexander does not specifically disclose a switch for transmitting the high-priority information in specific wavelength bands, or a controller connected to the switch for selecting the wavelength bands for the transmittal of the high-priority information given a sufficient total quality of the transmission.

Way teaches, in col.1, lines 41-51, that a typical communication system will compensate for poor quality of an optical channel. As the quality of a given channel deteriorates, defined as bit error rate (BER) and caused by a host of common problems, including polarization mode dispersion, a communication system will automatically switch the data stream to another optical channel in order to improve the overall quality. This would imply that there must be a switch to change the transmission of the data stream to a number of other wavelength bands (the switch having access to all channels), and mated with a controller to control it's function by responding to the overall quality of each channel. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to 1) have a switch to redirect high-priority information and 2) a controller to operate the switch according to the overall quality of the transmission channels.

Furthermore, it would have been obvious to one of ordinary skill in the art at the time the invention was made that all wavelength bands will have different transmission characteristics that are functions of time. It is very well known in the art that electromagnetic propagation is strongly affected by imperfect fiber symmetry, residual stress fields in the fiber, and imperfect

polarization of the EM wave, as well as external forces that change with time, such as external stress fields, thermal or mechanical, etc.

With respect to claim 2, in the same paragraph, col.1, lines 41-51 of Way, it states that a signal "arriving at an optical receiver must be of sufficient quality to allow the receiver to clearly distinguish the [signal]." Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have a quality determining device placed at the receiving side to determine the transmission quality of all wavelength bands. The only way the switch controller can respond to the overall quality of the transmission bands is if it is fed a signal from a device that can make the quality determination.

In regards to claim 3, it would have been obvious to one of ordinary skill in the art at the time the invention was made that the switch would have cross-connect, or NxN, switching elements at both ends of the network in order for the switch controller to be able to switch data transmission from one channel to another in order to compensate for reduced quality of the transmission.

With regards to claim 4, it would have been obvious to one of ordinary skill in the art at the time the invention was made to perform the switching in the electrical domain. Electrical switches of the sort are well known and proven in telecommunication systems. Particularly since fiber optic communications are replacing electrical communication networks, to continue switching in the electrical domain using existing equipment allows for cost-effective upgrading of current communication networks.

With respect to claim 5, it would have been obvious to one of ordinary skill in the art at the time the invention was made to perform the switching in the optical domain. Optical

switching takes far less space since there have been well known optical switches available, such as solid state switches, that can integrate seamlessly with other integrated circuit devices and interface well with optical fibers using known connector technologies. Furthermore, though more expensive that using existing electrical equipment, there is an improvement in switching speeds and can be more cost-effective in the long run to replace aging electrical switching systems when upgrading to optical fiber based communication.

In respect to claim 7, it would have been obvious to one of ordinary skill in the art at the time the invention was made that, as seen in Alexander, any wavelength bands not used for high-priority information are delegated to carrying the low priority information.

With regards to claim 8, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include PMD compensators in optical fiber transmission networks, such as the device disclosed in Way (Fig.2) and the state of the art as discussed in col.2, lines 20-46. Way specifically states that most of the PMDC techniques typically have been the use of optical devices being placed in the transmission path, using techniques such as adding a controlled delay, etc.

Regarding claim 9, it would have been obvious to one of ordinary skill in the art at the time the invention was made that the structure as applied above against claim 1 would satisfy the method including, 1) transmitting light signals over an optical link in wavelength bands, 2) selecting wavelength bands for transmitting high-priority information, 3) the number selected being less than the total bands available, and 4) the bands being of sufficient total quality of transmission of the optical signal.

With respect to claim 10, it would have been obvious to one of ordinary skill in the art at the time the invention was made that the structure as applied above against claim 2 would satisfy the method including: determining the quality of the transmission on the receiving side and using that signal for the wavelength band selection.

In regards to claim 11, it would have been obvious to one of ordinary skill in the art at the time the invention was made that the structure as applied above against claim 3 would satisfy the method including switching electrical signals to the selected wavelength bands on the transmitting end of the transmission line and switch the data in the wavelength bands back into electrical signals. Furthermore, since most data is still electrical, such as phone lines and 10base-T cables, the transmission system would have to transmit the data from electrical lines on one end to electrical lines on the other end.

With regards to claim 12, it would have been obvious to one of ordinary skill in the art at the time the invention was made that the structure as applied above against claim 4 would satisfy the method including switching electrical signals.

With respect to claim 13, it would have been obvious to one of ordinary skill in the art at the time the invention was made that the structure as applied above against claim 4 would satisfy the method including switching optical signals.

In regards to claim 15, it would have been obvious to one of ordinary skill in the art at the time the invention was made that the structure as applied above against claim 8 would satisfy the method including: providing for PMD compensation by putting such known optical devices at an end of the optical fiber transmission system.

Claims 6 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Alexander and Way and in view of Krol (US 2002/0126935) and Bergano (US 6,411,413).

With respect to claim 6, the structure as applied above against claim 1 applies here and the following. Though Alexander and Way do not disclose the use of tunable electro-optic transmitters as part of the switching mechanism, Krol teaches of using tunable filters for channel switching, on p.1, pars. [0005], [0006], and [0010]. These filters are tuned to specific bands (channels) within a transmission band.

Though Krol doesn't use tunable electro-optic transmitters, Bergano teaches the use of using such devices in col.4, lines 5-16. Tunable semiconductor lasers exist that are well known in the art to have wide tuning ranges within the optical transmission bands. Here, these tunable lasers can perform the same function as the prior art tunable filters described in Krol to select specific wavelength bands within a bandwidth.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use tunable electro-optic transmitters to perform specific wavelength band selection within a given bandwidth in an optical communication system. The tunable transmitters would negate the need for the complex optical switching required for wavelength band selection. Optical switches generally have as much as –3dB or more intensity reduction during transmission and contribute to other problems, including PMD. Using a tunable source would remove these added flaws in the transmission system, transmitting a cleaner, stronger signal into the transmission line.

In regards to claim 14, it would have been obvious to one of ordinary skill in the art at the time the invention was made that the structure as applied above against claim 6 would satisfy the

method including the use of electro-optic transmitters for selecting wavelength bands within a bandwidth.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Mao (US 2002/0131129) discloses the determination of BER as well as Q and SN ratio for "quality determination" of an optical transmission signal. Dishman (US 6,181,450), Swanson (US 6,433,904) and Alexander (US 6,233,077) all disclose fiber optic transmission systems that compensate for PMD.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas R Artman whose telephone number is (703) 305-0203. The examiner can normally be reached on 8am - 4:30pm Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on (703) 305-3492. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1782.

November 12, 2002

ROBERT H. KIM
SUPERVISORY PATENT EXAMINER
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